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FACSIMILE TRANSMISSION**DATE:** November 22, 2005**MATTER NUMBER:** 10023593

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AND INTERFERENCES**FROM:** James R. Crawford**USER ID:** JC01031 **FLOOR:** 24**PHONE:** (212) 318-3148**FAX:** (212) 318-3400**RE:****NUMBER OF PAGES WITH COVER PAGE:** 13**Message:****CAUTION - CONFIDENTIAL**

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HUBR-1165 (10023593)
IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant(s) : Stuke, et al.
Serial No. : 09/647,207
Filed : January 8, 2001
For : ADHESIVE-FREE BONDING OF POLYMERIC
COMPONENTS TO PRODUCE CLOSED MICRO- AND
NANOCHANNEL STRUCTURES
Art Unit : 1733
Examiner : J. Rossi

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November 22, 2005

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Eileen Sheffield 11/22/05
Eileen Sheffield

APPEAL BRIEF

MS Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

As required under § 41.37(a), this brief is filed within two months of the Notice of Appeal filed in this case on March 16, 2005, and is in furtherance of said Notice of Appeal.

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(I) REAL PARTY IN INTEREST

The real party in interest is the assignee, Max-Planck-Gesellschaft zur Förderung der Wissenschaften e.V.

(II) RELATED APPEALS AND INTERFERENCES

There are no known related appeals or interferences.

(III) STATUS OF CLAIMS

Claims 1-22, 25, 35, and 37-44 are canceled.

Claims 23-24, 26-34, 36, 45-46 are pending and were finally rejected.

(IV) STATUS OF AMENDMENTS

All amendments will have been entered.

(V) SUMMARY OF THE CLAIMED SUBJECT MATTER

The claimed invention is directed to a process for the adhesive-free production of polymeric components for a substrate having depressions on at least one surface that form micro- and nanochannel structures (page 1, lines 608).

This is accomplished by preparing a polymeric substrate which, on at least one surface, has depressions forming at least one of micro- and nanochannel structures. (page 1, lines 7-8). A polymeric covering is then applied to the surface using uniform pressure in the range of from 0.1 to 1000 kg/cm² extending over said surface, a polymeric covering to said surface. (page 3, line 36 - page 4, line 7).

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The substrate is then slowly heated along with the covering applied by uniform pressure to a temperature which is at least as high as the glass transition temperature of at least one of the substrate or of the covering and held at a temperature within $\pm 3^{\circ}\text{C}$ of the heating temperature for at least 15 minutes, for the bonding of the substrate and the covering. (page 4, lines 9-13 and 31-35).

The substrate is then cooled for up to 30 seconds down to a temperature of about 40°C . (page 5, line 1-2).

(VI) GROUND OF REJECTION TO BE REVIEWED ON APPEAL

1. Whether the final rejection of claims 23-24, 26-29 31, 34, 36, and 45-46 under 35 U.S.C. §103(a) as allegedly obvious over the combination of U.S. Patent No. 6,176,962 to Soane ("Soane") in view of U. S. Patent No. 5,882,465 to McReynolds ("McReynolds") and U.S. patent No. 3,997,386 to Oshida et al. ("Oshida") was in error.

2. Whether the rejection of claim 30 under 35 U.S.C. §103(a) as allegedly obvious over the combination of Soane, McReynolds, Oshida and U.S. Patent No. 6,046,056 to Parce et al. ("Parce") was in error.

Applicants submit both rejections are in error.

(VII) ARGUMENT

Soane does not disclose a) the heating time (but does disclose heating to a temperature that is 2 to 5°C above the glass transition temperature of the polymer at Col. 2, lines 63-65), b) the pressure range and, c) the cooling time and end temperature as claimed in independent claim 23.

McReynolds only generally discloses that the applied temperature and pressure will depend on the nature of the polymeric material(column 4, lines 32-36), for example PMMA

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(column 3, line 34), but, like Soane, does not disclose a holding time for the heating step time either.

Oshida discloses general methods for the adhesive-free combination of two polymeric components. Oshida does not disclose that there are depressions in the components and, therefore, Oshida is not concerned with solutions providing a smooth, crack-free bond between the two components, specifically where the depressions are found. In particular, Oshida is not clear about how the contact surfaces of the components should look. The two components in Oshida are pre-heated (see, e.g., claims 1, steps (a) and (b)), to slightly under their glass transition temperature, pressed together, and then heated under pressure to a temperature of about 20° to 50°C above the glass and temperature (see Oshida's claim 1, step c).

Oshida discloses a process pressure range of 100-400 g/mm² (which=10-40 kg/cm², column 3, Table). Oshida also discloses a glass transition temperature of 87°C and a cooling speed of 5°C/second down to 55°C/second, and then natural cooling (column 3, lines 19 to 29), which results in a total cooling time of $(87-55) / 5 = 6.4$ seconds. Further, Oshida discloses a material having a glass transition temperature of 50°C cooled down with 5°C/second to 30°C lower than the glass transition temperature of 50°C (= 20°, column 2, lines 6 to 10, and line 55), which results in a total cooling time of $30 / 5 = 6$ seconds.

In the former case, the high end temperature of 55°C, which is considerably above presently claimed (about 40°C) and, in the latter case considerably lower (25°C), which is a remarkable difference.

Importantly, however, Oshida, like Soane and McReynolds also fails to disclose a heating time, and, furthermore, Oshida does not disclose the presence of micro- or nanochannels. Faced with the problem of a polymer component containing microchannels, e.g., similar to that of Soane, and of avoiding the development of distortions or burs during the process of bonding the two components which project into the channels, their interface and, thereby, impeding the optical qualities the polymer members, the skilled artisan would not apply the overall teaching of Oshida or even parts thereof into consideration, because Oshida does not disclose and is not

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concerned with micro- or nano-channels. Even if an artisan were to select a pressure range and a cooling speed similar to that disclosed by Oshida, he or she would still not be able to discern a holding time for the substrate with the covering within $\pm 3^{\circ}\text{C}$ of the heating temperature for at least 15 minutes, as claimed in claim 23, step (c).

The claimed holding time leads to a thorough bonding of the two members in a sufficient time of at least 15 minutes, without generating irregularities, burs, etc. which could project into the microchannel, impeding the optical qualities of the polymeric member as a relative movement between the components is restricted.

If, however, there was no holding time, the members would be relatively displaced while the material of the interfaces is bonded so that some of the material might form burs, etc. entering into the microchannels or causing other irregularities at the interface, so that the optical quality of the polymeric member would be impeded.

Note that in Soane, column 3, line 4, the temperature is maintained above the glass transition temperature of the polymer for a time sufficient to allow the polymer molecules to interpenetrate at the two surfaces and create a morphological bonding. This, however, does not require holding the substrate with a covering over a certain time near the heating temperature for at least 15 minutes as presently claimed, and, furthermore, Sloane does not discuss the problem of burs projecting into the microchannels or similar irregularities degrading the optical quality. Thus, Soane cannot be used as a model for selecting such a relatively long holding time of at least 15 minutes to avoid such disadvantages.

Therefore, the holding time of at least 15 minutes as claimed in claim 23, is a feature of the present invention which is taught or suggested by Soane, Oshida or McReynolds, either individual or in combination. Therefore, claim 23, and all of its dependent claims, are believed to be patentable over a combination of Soane, Oshida and McReynolds because the Examiner has failed to set forth a *prima facie* case of obviousness because each and every limitation of the claim is not taught or suggested by the cited references. The only way the Examiner could arrive at the presently claimed invention is through the improper use of hindsight.

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The legal determination under section 103 is whether the claimed invention as a whole would have been obvious to a person of ordinary skill in the art at the time the invention was made. In re O'Farrell, 853 F.2d 894, 902, 7 USPQ2d 1673,1680 (Fed. Cir. 1988).

Obviousness cannot be established by combining the teachings of the prior art to produce the claimed invention, absent some teaching or suggestion supporting the combination. Under section 103, teachings of references can be combined only if there is some suggestion or incentive to do so. ACS Hosp. Systems, Inc. v. Montefiore Hosp., 732 F.2d 1572, 1577, 221 USPQ 929, 933 (Fed. Cir. 1984).

The mere fact that the prior art may be modified in the manner suggested by the Examiner does not make the modification obvious unless the prior art suggested the desirability of the modification. In re Fritch, 23 USPQ2d 1780, 1784 (Fed. Cir. 1992).

With respect to the rejection of claim 30, U.S. Patent No. 6,046,056 to Parce fails to remedy the deficiencies of the combination of Soane, McReynolds and Oshida.

In addition, with respect to claims 26, 27 and 28, the specific claimed ranges of the width or depth of the depressions do not appear to be disclosed by the references

With respect to claims 31 and 32, the cited references do not appear to disclose the specific claimed pressure ranges and values.

With respect to claim 33, the specific holding times do not appear to be taught or suggested by the cited references.

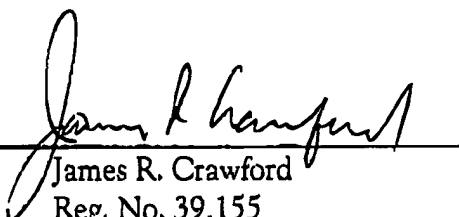
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With respect to claim 34, none of the references appear to specifically disclose a heating temperature as claimed.

In view of the foregoing, Applicants respectfully request reversal of the rejections.

Respectfully submitted,

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CLAIMS APPENDIX

Claims 1-22 (canceled)

23. A process for the adhesive-free production of polymeric components, including the steps of:

(a) preparing a polymeric substrate which, on at least one surface, has depressions forming at least one of micro- and nanochannel structures,

(b) applying, by uniform pressure in the range of from 0.1 to 1000 kg/cm² extending over said surface, a polymeric covering to said surface,

(c) slowly heating said substrate, with said covering applied by pressure, to a heating temperature which is at least as high as the glass transition temperature of at least one of said substrate and of said covering and holding the substrate with the covering within $\pm 3^{\circ}\text{C}$ of said heating temperature for at least 15 minutes, for the bonding thereof, and

(d) cooling the substrate for up to 30 seconds down to a temperature of about 40°C.

24. The process as claimed in claim 23, wherein the polymeric substrate and the polymeric covering are selected from the group consisting of acrylic polymers, polycarbonates, polystyrenes, and also copolymers and mixtures of these.

25. (canceled)

26. The process as claimed in claim 23, wherein the substrate has depressions with at least one of a width depth within the range from 10 nm to 2 mm.

27. The process as claimed in claim 26, wherein the substrate has depressions with a width or/and depth within the range from 100 nm to 1 mm.

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28. The process as claimed in claim 27, wherein the substrate has depressions with a width or/and depth within the range from 1 μm to 500 μm .

29. The process as claimed in claim 23, wherein substrate and covering are selected from among polymeric materials of the same type.

30. The process as claimed in claim 23, wherein at least the covering is selected from among optically transparent materials.

31. The process as claimed in claim 23, wherein the polymeric covering and the substrate are combined at a pressure of from 0.2 to 20 kg/cm^2 .

32. The process as claimed in claim 31, wherein the pressure applied is 2 kg/cm^2 .

33. The process as claimed in claim 23, wherein the duration of heating is within the range from 0.5 to 3 h.

34. The process as claimed in claim 23, wherein the heating temperature is not more than 5°C above the glass transition temperature.

35. (canceled)

36. The process as claimed in claim 35, wherein the substrate and covering present thereupon are held within the region of the heating temperature for a period of at least 30 min.

37. (canceled)

38. (canceled)

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39. (canceled)

40. (canceled)

41. (canceled)

42. (canceled)

43. (canceled)

44. (canceled)

45. The process as claimed in claim 24, wherein the polymeric substrate and the polymeric covering are polymethyl methacrylate polymers.

46. The process as claimed in claim 24, wherein the polymeric covering is a polymethyl methacrylate polymer.

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EVIDENCE APPENDIX

None

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RELATED PROCEEDINGS APPENDIX

None